

I/We Claim:

1. A composition for improving surface size and surface strength for cellulosic products comprising an aqueous sizing mixture of a film-forming binder, an anionic polymer and a cationic polymer.

2. The composition of claim 1, wherein the film-forming binder is a starch.

3. The composition of claim 2 wherein the cationic polymer and starch are provided using a cationic polymer-grafted onto said starch.

4. The composition of claim 2 wherein the anionic polymer and starch are provided using an anionic polymer-grafted onto said starch.

5. The composition of claim 2 wherein the anionic polymer is an alkali soluble, acid-containing copolymer.

6. The composition of claim 5 wherein the anionic polymer is selected from the group consisting of a hydrolyzed copolymer of styrene-maleic anhydride, or one of its salts; a copolymer of styrene-maleic acid, or one of its salts; a styrene-acrylic acid copolymer, or one of its salts, a styrene-methacrylic acid copolymer, or one of its salts, a styrene-fumaric acid copolymer, or one of its salts, a styrene-acrylonitrile-acrylic acid copolymer, or one of its salts, a styrene-butyl acrylate-acrylic acid copolymer, or one of its salts; a copolymer of styrene-acrylic ester dispersed in a copolymer of styrene-maleic acid, or one of its salts, and mixtures thereof.

7. The composition of claim 5 wherein the cationic polymer is selected from the group consisting of a polyamine; a polyethylene imine; a styrene-maleic anhydride copolymer imide quaternary ammonium salt; a polyamidoamine-epichlorohydrin resin; a dialkylamine-epichlorohydrin resin; a homo- or copolymer of diallyldimethyl-ammonium chloride; a homo- or copolymer of a vinyl amine; a homo- or copolymer of a (meth)acrylamide; a homo- or copolymer of a (meth)acrylate, and corresponding acid addition salts and quaternary ammonium salts thereof.

8. The composition of claim 1 comprising a mixture of starch grafted with a copolymer of diallyldimethylammonium chloride-acrylamide and an alkali soluble, acid containing copolymer.

9. The composition of claim 2 comprising an anionic polymer latex having sulfonic or carboxylic moieties and a polyamidoamine-epichlorohydrin resin.

10. The composition of claim 2 comprising a copolymer of styrene-acrylic ester dispersed in a copolymer of styrene-maleic acid, or one of its salts and a polyamidoamine-epichlorohydrin resin.

11. The composition of claim 8 wherein the alkali soluble, acid containing copolymer is selected from the group consisting of a hydrolyzed copolymer of styrene-maleic anhydride, or one of its salts; a copolymer of styrene-maleic acid, or one of its salts; a styrene-acrylic acid copolymer, or one of its salts, a styrene-methacrylic acid copolymer, or one of its salts, a styrene-acrylonitrile-acrylic acid copolymer, or one of its salts, a styrene-butyl acrylate-acrylic acid copolymer, or one of its salts and mixtures thereof.

12. A composition for improving surface size and surface strength for cellulosic products comprising an aqueous sizing mixture of a film-forming binder, an anionic polymer and a cationic polymer, wherein the film-forming binder is a starch, wherein the anionic polymer is selected from the group consisting of a hydrolyzed copolymer of styrene-maleic anhydride, or one of its salts; a copolymer of styrene-maleic acid, or one of its salts; a styrene-acrylic acid copolymer, or one of its salts, a styrene-methacrylic acid copolymer, or one of its salts, a styrene-fumaric acid copolymer, or one of its salts, a styrene-acrylonitrile-acrylic acid copolymer, or one of its salts, a styrene-butyl acrylate-acrylic acid copolymer, or one of its salts; a copolymer of styrene-acrylic ester dispersed in a copolymer of styrene-maleic acid, or one of its salts, and mixtures thereof, wherein the cationic polymer is selected from the group consisting of a polyamine; a polyethylene imine; a styrene-maleic anhydride copolymer imide quaternary ammonium salt; a polyamidoamine-epichlorohydrin resin; a dialkylamine-epichlorohydrin resin; a homo- or

copolymer of diallyldimethyl-ammonium chloride; a homo- or copolymer of a vinyl amine; a homo- or copolymer of a (meth)acrylamide; a homo- or copolymer of a (meth)acrylate, and corresponding acid addition salts and quaternary ammonium salts thereof, and wherein the anionic and cationic polymers are provided in a weight ratio of anionic polymer to cationic polymer of between about 0.2:1 to about 2.5:1.

13. A method of sizing a cellulosic web comprising applying to a surface of the cellulosic web an aqueous sizing composition comprising a mixture of a film-forming binder, an anionic polymer and a cationic polymer.

14. The method of claim 13 wherein the film-forming binder is a starch.

15. The method of claim 14 wherein the cationic polymer and starch are provided using a cationic polymer-grafted onto said starch.

16. The method of claim 14 wherein the anionic polymer and starch are provided using an anionic polymer-grafted onto said starch.

17. The method of claim 14 wherein the anionic polymer is selected from the group consisting of a hydrolyzed copolymer of styrene-maleic anhydride, or one of its salts; a copolymer of styrene-maleic acid, or one of its salts; a styrene-acrylic acid copolymer, or one of its salts, a styrene-methacrylic acid copolymer, or one of its salts, a styrene-fumaric acid copolymer, or one of its salts, a styrene-acrylonitrile-acrylic acid copolymer, or one of its salts, a styrene-butyl acrylate-acrylic acid copolymer, or one of its salts; a copolymer of styrene-acrylic ester dispersed in a copolymer of styrene-maleic acid, or one of its salts, and mixtures thereof.

18. The method of claim 14 wherein the anionic polymer is an alkali soluble, acid containing copolymer

19. The method of claim 18 wherein the cationic polymer is selected from the group consisting of a polyamine; a polyethylene imine; a styrene-maleic anhydride copolymer imide quaternary ammonium salt; a polyamidoamine-epichlorohydrin resin; a

dialkylamine-epichlorohydrin resin; a homo- or copolymer of diallyldimethyl-ammonium chloride; a homo- or copolymer of a vinyl amine; a homo- or copolymer of a (meth)acrylamide; a homo- or copolymer of a (meth)acrylate, and corresponding acid addition salts and quaternary ammonium salts thereof.

20. The method of sizing of claim 13 wherein the aqueous sizing composition comprises a mixture of starch grafted with a copolymer of diallyldimethylammonium chloride-acrylamide and an alkali soluble, acid containing copolymer.

21. The method of claim 13 wherein the aqueous sizing composition comprises an anionic polymer latex having sulfonic or carboxylic moieties and a polyamidoamine-epichlorohydrin resin.

22. The method of claim 13 wherein the aqueous sizing composition comprises a copolymer of styrene-acrylic ester dispersed in a copolymer of styrene-maleic acid, or one of its salts and a polyamidoamine-epichlorohydrin resin.

23. The method of claim 20 wherein the alkali soluble, acid containing copolymer is selected from the group consisting of a hydrolyzed copolymer of styrene-maleic anhydride, or one of its salts; a copolymer of styrene-maleic acid, or one of its salts; a styrene-acrylic acid copolymer, or one of its salts, a styrene-methacrylic acid copolymer, or one of its salts, a styrene-acrylonitrile-acrylic acid copolymer, or one of its salts, a styrene-butyl acrylate-acrylic acid copolymer, or one of its salts and mixtures thereof.

24. A sized cellulosic web made by the method of claim 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 or 23.